Volunteer Lake Assessment Program Individual Lake Reports

PAWTUCKAWAY LAKE, NOTTINGHAM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	13,248	**Max. Depth (m):**	15.2	**Flushing Rate (yr^{1})**	2.3
Surface Area (Ac.):	900	**Mean Depth (m):**	2.9	**P Retention Coef:**	0.61
Shore Length (m):	27,700	**Volume (m^3):**	10,740,000	**Elevation (ft):**	250

TROPHIC CLASSIFICATION

Year	Trophic class
1989	MESOTROPHIC
1998	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

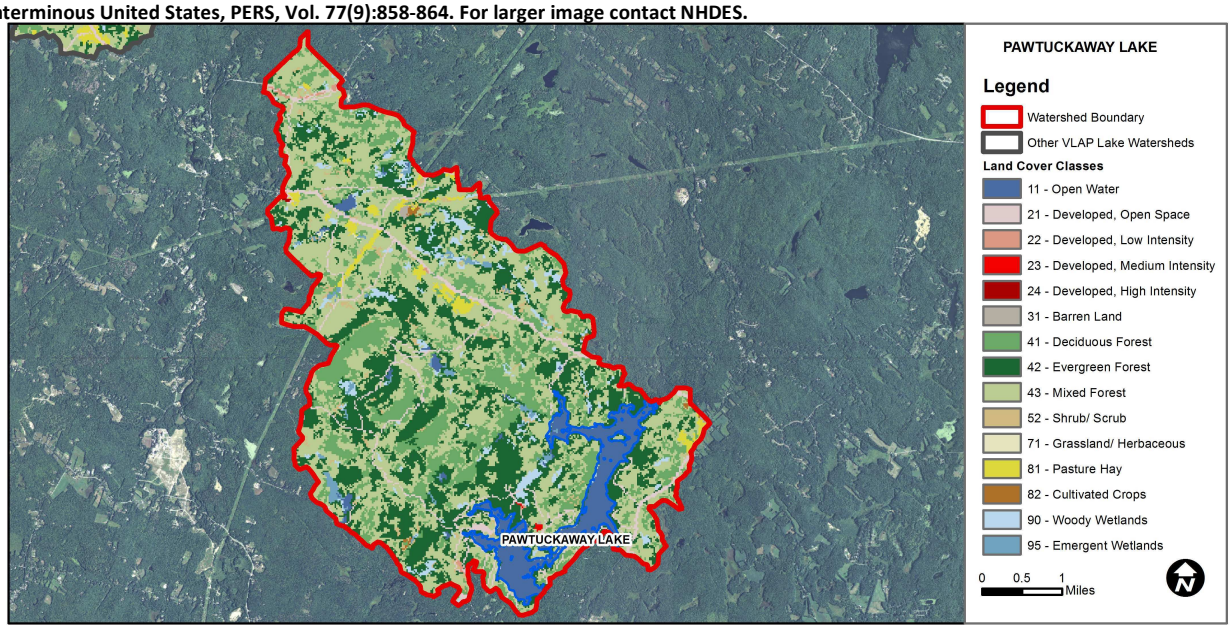
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	Oxygen, Dissolved	Very Good	There are a total of at least 10 samples with 0 exceedances of criteria.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Good	There are at least 10 samples with one, but < 10% of samples, exceeding indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

PAWTUCKAWAY LAKE - TOWN BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
PAWTUCKAWAY LAKE - PAWTUCKAWAY STATE PARK BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.
PAWTUCKAWAY LAKE - PAWTUCKAWAY STATE PARK BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	6.52	Barren Land	0.09	Grassland/Herbaceous	0.06
Developed-Open Space	4.12	Deciduous Forest	16.26	Pasture Hay	1.5
Developed-Low Intensity	0.19	Evergreen Forest	26.59	Cultivated Crops	0.16
Developed-Medium Intensity	0.05	Mixed Forest	38.87	Woody Wetlands	3.15
Developed-High Intensity	0.02	Shrub-Scrub	1.49	Emergent Wetlands	0.92

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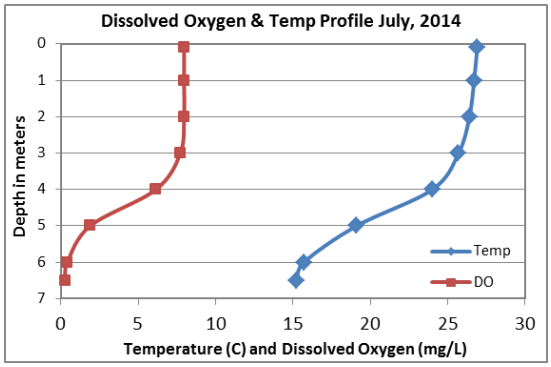
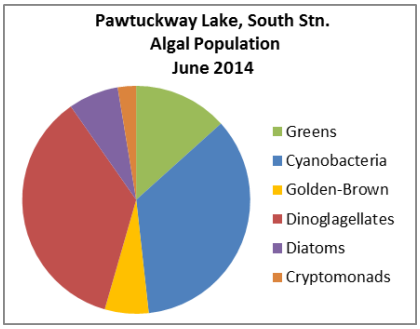
Pawtuckaway Lake, South Stn., Nottingham
2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were slightly greater than the state median in May, decreased to low levels in June and remained stable through Sept. The 2014 average chlorophyll level was less than the state median and the lowest measured since 1993. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **Conductivity/Chloride:** Deep spot, Dollof Dam and Mountain Bk. conductivity and chloride levels remained stable from May through Sept. and were approximately equal to the state medians. Historical trend analysis indicates stable epilimnetic (upper water layer) conductivity since monitoring began.
- **Total Phosphorus:** Epilimnetic and hypolimnetic (lower water layer) phosphorus levels were elevated in May during spring runoff and turnover and following a significant storm event. Epilimnetic phosphorus decreased to low levels and remained stable from June through Sept. and the 2014 average was less than the state median. Hypolimnetic phosphorus decreased to average levels in June and July, was elevated in August potentially due to bottom sediment and then decreased to average levels in Sept.. Historical trend analysis indicates relatively stable epilimnetic and hypolimnetic phosphorus with moderate variability between years. Mountain Bk. phosphorus levels remained within an average range for that station on each sampling event.
- **Transparency:** Transparency has been measured with the use of a viewscope since 2007; prior to that transparency was measured with and without the viewscope. Transparency was lower in May when algal growth was higher and then improved and was better than the state median from June through Sept. The 2014 average transparency was better than the state median and the best measured since 2009. Historical trend analysis ('07-'14) indicates relatively stable transparency with moderate variability between years.
- **Turbidity:** Epilimnetic turbidity was slightly elevated in Sept. during a rain event. Hypolimnetic turbidity was slightly elevated in August potentially due to bottom sediment or the formation and accumulation of organic compounds in hypolimnetic waters as the summer progressed and dissolved oxygen levels were depleted. Mountain Bk. turbidity levels were in a low range for that tributary in May and August and increased during low flow in June, July and Sept.
- **pH:** Epilimnetic pH was within the desirable range 6.5-8.0 units however hypolimnetic pH was less than desirable from May through August. Historical trend analysis indicates stable epilimentic pH since monitoring began. Mountain Bk. pH was generally within the desirable range.
- **Recommended Actions:** Water quality was good in 2014 and remained within low to average ranges for most parameters. Mountain Brook phosphorus levels, although in an elevated range, have remained relatively stable since monitoring began. However, efforts should be made by State Park, lake and watershed residents to reduce the impacts of stormwater and erosion in this tributary's sub-watershed. DES' "NH Homeowner's Guide to Stormwater Management" is a great resource as well as UNH Cooperative Extension's "Landscaping at the Water's Edge" .





Station Name	Table 1. 2014 Average Water Quality Data for Pawtuckaway Lake, South Stn.							
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m VS	Turb. ntu	pH
Epilimnion	4.8	3.07	6	41.3	10	4.46	1.12	6.72
Hypolimnion				43.5	14		2.25	6.25
Dolloff Dam			6	42.6	11		1.11	6.72
Mountain Brook			3	36.6	31		2.33	6.57

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data show low variability.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.